

*Continued*

or proto-oncogene product is [encoded by a human oncogene or proto-oncogene] of human origin.

4. (Amended) A recombinant pox virus of Claim 1, wherein the [tumor associated antigen is encoded by a human oncogene and] oncogene or proto-oncogene product which is responsible or potentially responsible for oncogenic activity is rendered inactive [with respect to its oncogenic activity] by a mutational alteration.
5. (Amended) A recombinant pox virus of Claim 1, wherein the [tumor antigen] oncogene or proto-oncogene product is encoded by the neu gene, the ros gene, the trk gene, the kit gene or immunogenic portions thereof.
6. (Amended) A recombinant pox virus of Claim 1, wherein the [cell-encoded tumor associated antigen] oncogene or proto-oncogene product is [a] growth factor receptor [or growth factor receptor-like cell surface] molecule.
7. (Amended) A recombinant pox virus of Claim 6, wherein the receptor [or receptor-like cell surface] molecule is encoded by the c-erbB gene.
8. *Subst. B2* (Amended) A recombinant vaccinia virus containing, in a region of the viral genome nonessential for replication of the virus, one or more foreign oncogene or proto-oncogene

*Amended 1*  
*B3*  
*Amended*

encoding DNA sequences of cellular origin which encode an oncogene or proto-oncogene product [which encode a cell encoded, human tumor-associated antigen], the sequence or sequences being under control of a vaccinia promoter.

9. (Amended) A recombinant vaccinia virus of Claim 8, wherein the [tumor-associated antigen] oncogene or proto-oncogene product is [encoded by a human oncogene] of human origin.

- Sub B3*
10. (Amended) A recombinant vaccinia virus of Claim 8, wherein the foreign oncogene is neu, ros, trk or kit gene or [a] immunogenic portions thereof.

11. (Amended) A recombinant vaccinia virus of Claim 9, wherein the oncogene [is devoid of oncogenic activity] or proto-oncogene product which is responsible or potentially responsible for oncogenic activity is rendered inactive by a mutational alteration.

- Sub B4*
12. (Amended) A recombinant vaccinia virus of Claim 8, wherein the [tumor associated antigen] oncogene or proto-oncogene product is [a] an altered growth factor receptor [or growth factor receptor-like surface] molecule.

13. (Amended) A recombinant vaccinia virus of Claim 12, wherein the [tumor associated

*A. Contd.*  
antigen] oncogene or proto-oncogene product is encoded by the c-erbB gene.

*A. 2. Sub 1*  
15. (Amended) A method of immunizing against [a cell-encoded tumor associated antigen] an oncogene or proto-oncogene product encoded by a gene of cellular origin comprising the steps of inoculating an individual afflicted with a tumor which expresses the [antigen] oncogene or proto-oncogene product with a recombinant pox virus capable of expressing the [cell-encoded tumor associated antigen] cellular oncogene or proto-oncogene product.

16. (Amended) <sup>The</sup> ~~A~~ [recombinant pox virus] method of Claim 15, [which] wherein the recombinant pox virus is [of the species] a vaccinia virus.

17. (Amended) A [recombinant pox virus] method of Claim 15, wherein the [tumor-associated antigen] oncogene or proto-oncogene product is [encoded by a human oncogene or proto-oncogene] of human origin.

*Sub 2*  
18. (Amended) A [recombinant pox virus] method of Claim 15, wherein the [tumor associated antigen] oncogene or proto-oncogene product is [encoded by a human oncogene] of human origin and is rendered inactive with respect to its oncogenic activity, the inactivity resulting from a mutational alteration.

- A<sup>2</sup> Sub 11*  
*Cent 1*
19. (Amended) A [recombinant pox virus] method of Claim 15, wherein the [tumor antigen] oncogene product is encoded by the neu, ros, trk or kit gene or immunogenic portions thereof.
- Sub 2*
20. (Amended) A [recombinant pox virus] method of Claim 15, wherein the [cell-encoded tumor associated antigen] oncogene or proto-oncogene product is [a] growth factor receptor [or growth factor receptor-like cell surface] molecule.
- The*
21. (Amended) ~~A~~<sup>20</sup> [recombinant pox virus] method of Claim ~~15~~<sup>20</sup>, wherein the altered receptor [or receptor-like cell surface] molecule is encoded by the c-erbB gene.
- Sub B7*
22. (Amended) A method of immunizing an individual against [a cell-encoded tumor-associated antigen] an oncogene or proto-oncogene product encoded by a gene of cellular origin, comprising inoculating the individual afflicted with a tumor bearing [the antigen] the product with a recombinant vaccinia virus capable of expressing the [tumor-associated antigen] oncogene or proto-oncogene product.
23. (Amended) A method of producing [a cell-encoded tumor-associated antigen] an oncogene or proto-oncogene product encoded by a gene of cellular origin, comprising the steps of:
- a. infecting cells with a recombinant pox virus capable of expressing [a cell-

- A-2  
Cont'd
- encoded tumor associated antigen] the oncogene or proto-oncogene product;
  - b. culturing the cells under conditions which allow the virus to replicate and to express the [antigen] oncogene or proto-oncogene product; and
  - c. isolating the [antigen] oncogene or proto-oncogene product from the cells.
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- A-3  
Sent B8
27. (Amended) A vector for recombination with a pox virus and for incorporation of a DNA sequence encoding [a cellular tumor-associated antigen] an oncogene or proto-oncogene product encoded by a gene of cellular origin, comprising:
- a. a prokaryotic origin replication;
  - b. a pox viral promoter linked to;
  - c. a DNA sequence located downstream of the pox viral promoter, encoding a [for a cell-encoded, tumor-associated antigen] cellular oncogene or proto-oncogene product under the direction of the pox viral promoter; and
  - d. DNA sequences [homologous to a region of the pox virus genome where the DNA sequence encoding the tumor-associated antigen is to be inserted, the DNA sequences flanking the promoter and DNA sequence for the cell-encoded, tumor-associated antigen at both the 5' and 3' ends] of pox virus flanking the promoter and the DNA sequence, the DNA sequences being sufficiently homologous to a region

B8  
A3  
Cont'd

of the pox viral genome so that the promoter and the DNA sequence are integrated into the viral genome at a site nonessential for replication of the virus.

A4

29. (Amended) A vector of Claim [28] 27, wherein the pox viral promoter is a vaccinia promoter [and the flanking DNA sequences are homologous to a region of the vaccinia viral genome which is nonessential for replication of the virus].

Sub B9

30. (Amended) A vector of Claim 29, wherein the DNA sequence[s] for the [cell-encoded, tumor-associated antigen] oncogene product [are] is selected from the group consisting of the neu gene, the ros gene, the trk gene, the kit gene, the c-erbB gene, [and] or immunogenic portions thereof.

Add the following new claims:

A5  
Sub B10

32. A recombinant pox virus of Claim 1, wherein the oncogene or proto-oncogene product is a protein kinase.

33. A recombinant vaccinia virus of Claim 8, wherein the oncogene or proto-oncogene product is a protein kinase.

34. A method of Claim 15, wherein the oncogene or proto-oncogene product is a protein kinase.